

This question paper contains 8 printed pages]

Roll No.

01/12/17

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S. No. of Question Paper : 6820

Unique Paper Code : 32353301

Name of the Paper : Latex and HTML

Name of the Course : Skill Enhancement Course :

B.Sc. (Hons.)/B.Sc. (Prog.)/B.Sc.

Math. Sciences

Semester : III

Duration : 2 Hours

Maximum Marks : 50

(Write your Roll No. on the top immediately on receipt of this question paper.)

All questions are compulsory.

I. Fill in the blanks : 5×1=5

(1) The array environment is opened with a
command.

P.T.O.



- (2) command is used in pstricks to change the unit.
- (3) command is used in pstricks to put a label at a specified point.
- (4) tag is used in HTML for making text or image a hyperlink.
- (5) element in HTML may be opened and closed with a single tag.

II. Answer any *eight* parts from the following : $8 \times 2\frac{1}{2} = 20$

- (1) What is the difference between the commands $\backslash equationarray$ and $\backslash equationarray^*$.
- (2) How to give space while typing mathematical expressions in LaTeX ?
- (3) Write a set of commands in LaTeX that will produce the matrix :

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$$

- (4) What is the general syntax of the macro `\psaxes` for drawing a co-ordinate axis in `pstricks` ?
- (5) Write the input command for the following equation in LaTeX environment :

$$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}.$$

- (6) What is the use of `<a>` tag in HTML ? Give its general syntax.
- (7) What is wrong with the following input :
- ```
<img src = "complete graph order.gif" width = "300"
height = "300">
```
- (8) How do you add a comment to an HTML document ?
- (9) Write a code in LaTeX for typesetting the following :

$$1 + 2 = 3$$

$$4 + 5 + 6 = 7 + 8$$

$$9 + 10 + 11 + 12 = 13 + 14 + 15$$

(10) Give the syntax for the following macros :

(i) put

(ii) psarc

III. Answer any *five* parts from the following :

5×5=25

(i) Write the input of the following in LaTeX environment :

$$\begin{aligned} \prod_p \left( 1 - \frac{1}{p^2} \right) &= \prod_p \frac{1}{1 + \frac{1}{p^2} + \frac{1}{p^4} + \dots} \\ &= \left( \prod_p \left( 1 + \frac{1}{p^2} + \frac{1}{p^4} + \dots \right) \right)^{-1} \\ &= \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots \right)^{-1} \\ &= \frac{6}{\pi^2} \end{aligned}$$

(ii) Write the input command to draw the graph of the function

$$y = \sin \frac{1}{x} \text{ using pstricks.}$$



(iii) Write the code in LaTeX to typeset the following :

Define

$$V_n = \begin{bmatrix} 1 & 1 & 1 & \dots & 1 \\ x_1 & x_2 & x_3 & \dots & x_n \\ x_1^2 & x_2^2 & x_3^2 & \dots & x_n^2 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \dots & x_n^{n-1} \end{bmatrix}$$

(iv) Find the errors in the following LaTeX source, write a corrected version and write its output :

```
\documentclass{article}
```

```
\usepackage{graphicx}
```

```
\title{An easy article}
```

```
\author{A Student}
```

```
\maketitle
```

```
\begin{document}
```

This article aims to prove that for any  $x \in \mathbf{R}$

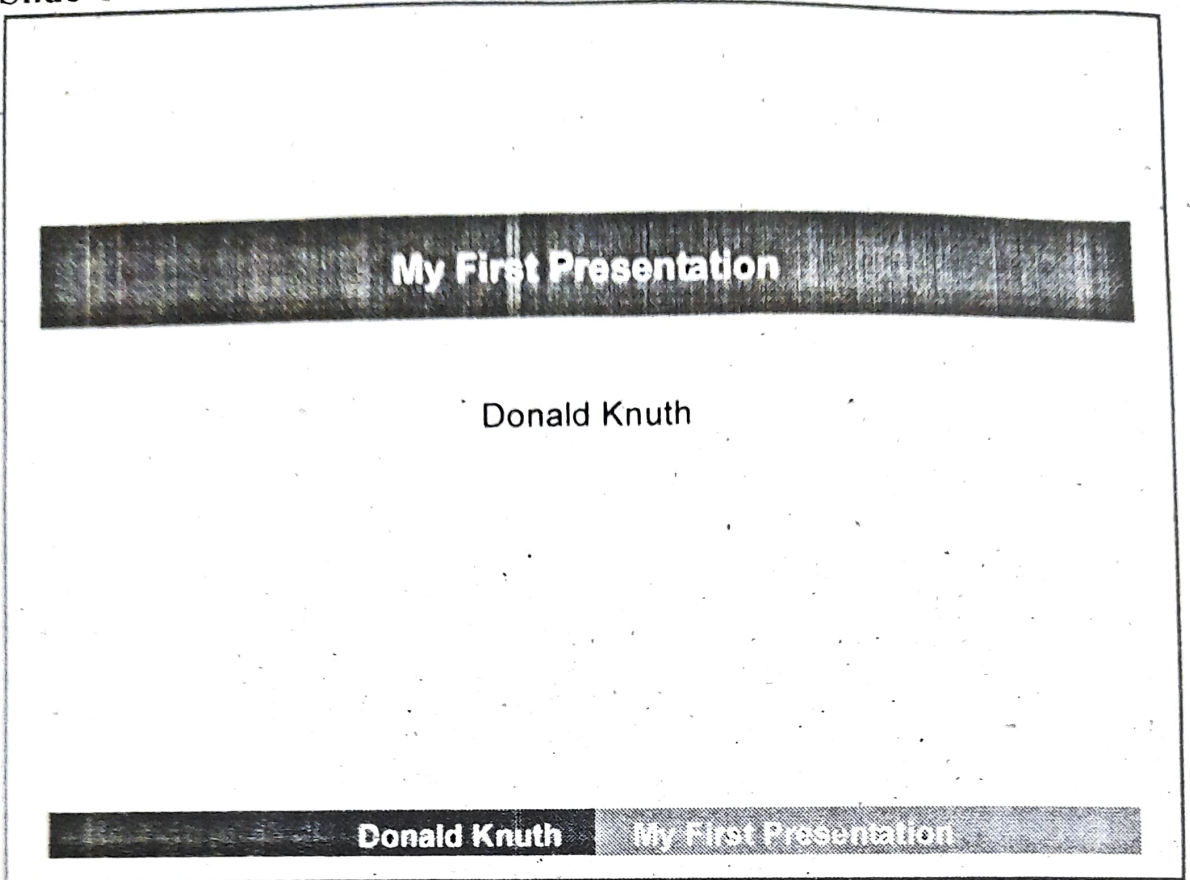
```
[\frac{\frac{x}{2}}{\frac{1}{4}} = 2 x \]
```

```
\end{document}
```

Which has already been proven.

(v) Write LaTeX code in beamer to prepare the following presentation.

## Slide-1



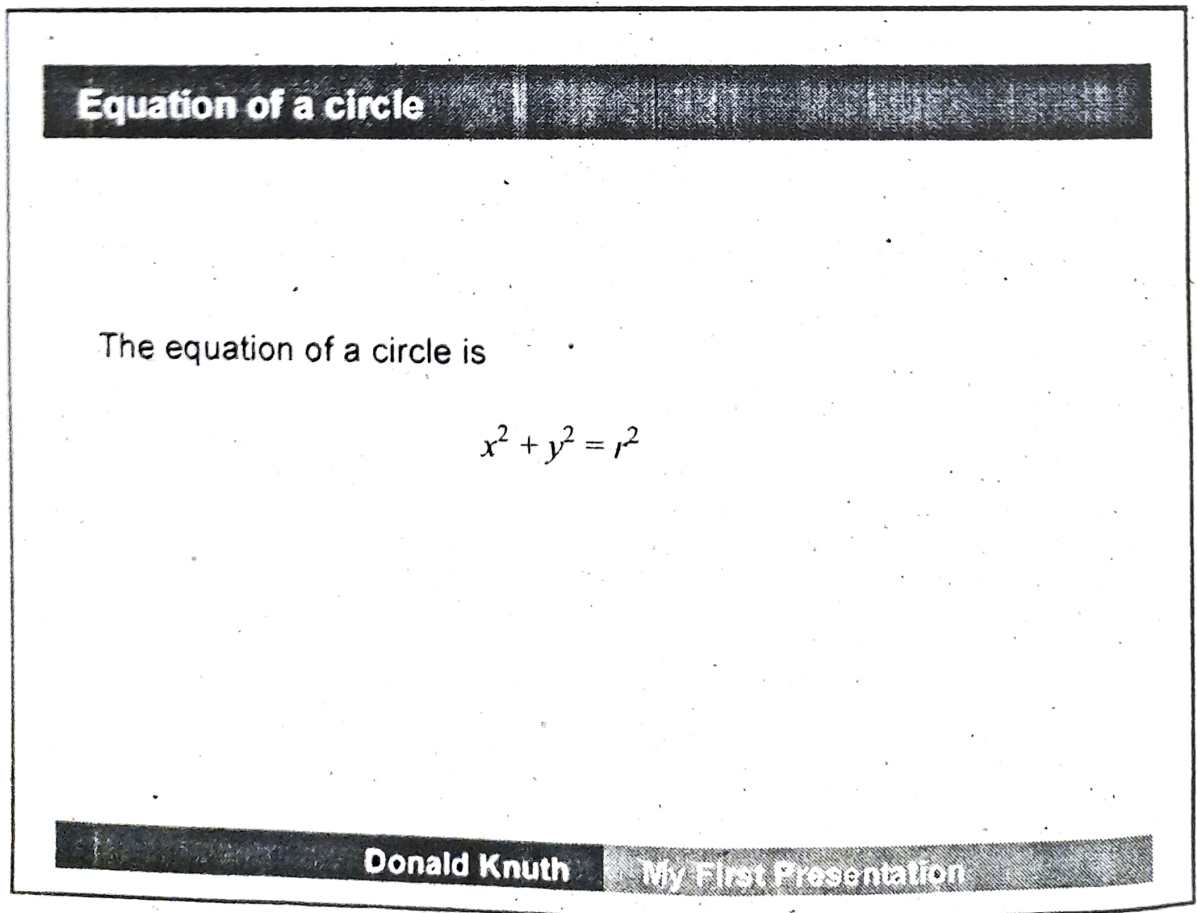
My First Presentation

Donald Knuth

Donald Knuth My First Presentation

This slide features a dark horizontal bar at the top with the text "My First Presentation" in white. Below this bar, the name "Donald Knuth" is centered. At the bottom of the slide, there is a footer bar divided into two sections: "Donald Knuth" on the left and "My First Presentation" on the right.

## Slide-2



Equation of a circle

The equation of a circle is

$$x^2 + y^2 = r^2$$

Donald Knuth My First Presentation

This slide features a dark horizontal bar at the top with the text "Equation of a circle" in white. Below this bar, the text "The equation of a circle is" is followed by the equation  $x^2 + y^2 = r^2$  centered. At the bottom of the slide, there is a footer bar divided into two sections: "Donald Knuth" on the left and "My First Presentation" on the right.

## Slide-3

**Conic Sections**

Conic sections are classified into

- Pair of straight lines
- Parabola
- Ellipse
- Hyperbola

**Donald Knuth**

My First Presentation

## Slide-4

Thank You

**Donald Knuth**

My First Presentation

(vi) Write HTML code to generate the following web page :

## University of Delhi

Colleges of Delhi University offering Hons. courses in Physics, Chemistry and Mathematics at the undergraduate level

### • North Campus

- (1) Hindu College
  - (a) Mathematics
  - (b) Physics
- (2) Hansraj College
  - (a) Chemistry
  - (b) Mathematics

### • South Campus

- (1) ARSD College
  - (a) Physics
  - (b) Mathematics

Keep the following in mind while writing the code :

- (a) Font face for the text should be Arial.
- (b) Text color of the main heading should be blue.
- (c) Rest of the text should be in purple.

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[This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : 6820A HC

Unique Paper Code : 42353327



Name of the Course : **Mathematics Skill Enhancement Course**

Name of the Paper : Mathematical Typesetting System : LaTeX

Semester : III

**Time : 2 Hours** **Maximum Marks : 38**

**Instructions for Candidates :**

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
- (b) **All** questions are compulsory.

1. Fill in the blanks any **four** parts from the following :  $4 \times 0.5 = 2$

- (i) The command ..... in the LaTeX document produces a medium space.
- (ii) The ..... command tells TeX to print its entire argument on the same line.
- (iii) Indentation can be prevented in a paragraph of a LaTeX document with the ..... command.

P.T.O.



- (iv) In pspicture environment, the command ..... produces an ellipse centered at (0,0) with major axis 6 units and minor axis 4 units.
- (v) A mathematical formula appearing in the display mode is enclosed by ..... and ..... commands.

2. Answer any **eight** parts from the following :

$$8 \times 2 = 16$$

- (i) Write the difference between `\hspace` and `\hspace*` commands.
- (ii) Typeset the following in a displayed formula :

$$\underbrace{a + b + \dots + y + z}_{26}^{\quad \quad \quad 24}$$

- (iii) Explain the `\q bezier` command in the LaTeX picture environment.
- (iv) Draw a square of side 4 units with reference point (1,-2) and rounded corners.
- (v) Write the command to draw an arrow at (4,4) of length 10 units in the direction of positive x-axis.
- (vi) In PS Tricks picture environment, write a command to change unit-length of x-axis and y-axis by 2 centimeter and 3 centimeter, respectively.

- (vii) Give the command in LaTeX to produce an expression :

$$\frac{1}{b-a} \int_a^b f'(x) dx = \frac{f(b)-f(a)}{b-a}$$

- (viii) Write the code in LaTeX in display math mode to produce an output.

If  $x \succ y$  then  $x \succeq y+1$ .

- (ix) Write the following postfix expression in standard form :

$x \sin 1 x \cos 2 \exp \text{ add div } 3 \exp$ .

- (x) Give a command to draw sector of a circle of radius 2 units centered at (3,3), going from reference angle 0 to 60 degrees.

3. Answer any **three** parts from the following :

$$4+4+4=12$$

- (a) Plot step function  $f(x) = [x]$ ,  $0 \leq x < 5$  in the picture environment.

- (b) Write the code in LaTeX to obtain an expression :

$$e^x = \frac{x^0}{0!} + \frac{x^1}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

$$e^x = \frac{(-1)^0}{0!} + \frac{(-1)^1}{1!} + \frac{(-1)^2}{2!} + \frac{(-1)^3}{3!} + \dots$$

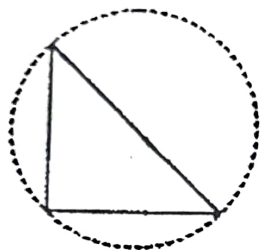
$$e^{-1} = \frac{1}{0!} - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} + \dots$$



- (c) Make the following equation in LaTeX using delimiters :

$$\begin{vmatrix} i & j & k \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix} = \begin{vmatrix} a_2 & a_3 \\ b_2 & b_3 \end{vmatrix} i - \begin{vmatrix} a_1 & a_3 \\ b_1 & b_3 \end{vmatrix} j + \begin{vmatrix} a_1 & a_2 \\ b_1 & b_2 \end{vmatrix} k .$$

- (d) Write a code in LaTeX using PSTricks to draw the following :



4. Write a presentation containing in beamer with the following content. 8

Slide-1 : Title of the presentation with author and date.

Slide-2: Fermat's Last Theorem. Let  $n > 2$  be any interger, then the equation

$$x^n + y^n = z^n$$

has no solutions in positive integers for any  $x$ ,  $y$  and  $z$ .

Slide-3 : This result is called his last theorem, because it was the last of his claims in the margins to be either proved or disproved. Andre Wiles found the first accepted proof in 1995, some 350 years later, Wiles proof is exceptionally long and difficult! 8

Slide-4: Thank you



This question paper contains 3 printed pages]

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S. No. of Question Paper : 6975  
Unique Paper Code : 42163302  
Name of the Paper : Biofertilisers  
Name of the Course : B.Sc. (Prog.) : SEC  
Semester : III



Duration : 3 Hours

Maximum Marks : 37.5

(Write your Roll No. on the top immediately on receipt of this question paper.)

All questions are compulsory.

1. (a) Define the following and elaborate in *one-two* sentences (any *five*) : 5

- (i) Biopesticides
- (ii) Chitinases
- (iii) Root nodule
- (iv) Symbiosis
- (v) Organic farming
- (vi) Vesicle
- (vii) Compost.

(b) Match the following :

2.5

(i) Organisms which associates (a) *Azotobacter*  
symbiotically to form root

nodules

(ii) Organisms which form (b) *Azolla*

arbuscules

(iii) Free living nitrogen fixers (c) *Rhizobium*

(iv) Symbiotically associating (d) *Nostoc*

pteridophyte

(v) Blue green algae important in (e) AMF

rice cultivation

2. Write short notes on the following (any *three*) :

15

(a) *Rhizobium* as wonder biofertiliser

(b) Vermicomposting

(c) Ectomycorrhiza

(d) Biocontrol agents.

3. Attempt any *two* :

15

- (i) What is organic farming ? How green manure is superior to chemical fertilizers ? Explain with suitable examples.
- (ii) Blue green algae acts as important biofertilisers. Explain with suitable examples.
- (iii) What are AM fungi ? What are the methods employed in mass multiplication ?

This question paper contains 4 printed pages

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S. No. of Question Paper : 6981

Unique Paper Code : 32163302

Name of the Paper : Intellectual Property Rights

Name of the Course : B.Sc. (H) Botany/B.Sc. (Prog.) : SEC

Semester : III

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any five questions.

Question No. 1 is compulsory.

All questions carry equal marks.

Attempt all parts of a question together.

1. (A) Expand the following abbreviations (any five) :  $1 \times 5 = 5$

(i) TRIPS

(ii) WIPO

(iii) USPTO

(iv) NBPGR

(v) TKDL

(vi) CBD

(vii) CGPDTM



(B) State True or False :

1×5=5

- (i) Mysore agarbathi is a GI.
- (ii) Photographs do not have copyright protection.
- (iii) Domain names may be protected under the Trademarks Act in India.
- (iv) Agricultural methods are not patentable in India.
- (v) Furniture design comes under IPR

(C) Match the following :

1×5=5

- (i) Logo (a) Simla
- (ii) Darjeeling tea (b) Copyrights
- (iii) Photographs (c) Cuttack
- (iv) Central Potato Research Institute (d) Trademark
- (v) Central Rice Research Institute (e) Geographic Indication

2. (A) Define the following with *one* example each (any *five*) :

2×5=10

- (i) Patents
- (ii) Copyrights
- (iii) Trademarks
- (iv) Biological Database



(v) Industrial design

(vi) GM crops

(vii) Concept of novelty.

(B) Write a brief note on rights of farmers under the Plant Varieties and Farmers Act in India. 5

3. Write short notes on any *three* of the following :  $3 \times 5 = 15$

(a) Domain name protection

(b) Non-patentable inventions

(c) Types of Trademarks

(d) Subject matter of Copyright Act

(e) Protection of semi-conductor chips.

4. Differentiate between any *three* of the following :  $3 \times 5 = 15$

(a) Process patents and Product patents

(b) Trademarks and GI

(c) Bio-piracy and Bio-prospecting

(d) Infringement and Passing off.

5. Attempt any *two* of the following :  $2 \times 7.5 = 15$

(a) Define GI. Discuss the criteria for granting GI to a product. Give *two* examples.



(b) What is traditional knowledge ? Why does it need protection ? Discuss the role of TKDL in protecting traditional knowledge.

(c) Discuss the importance of Patenting Biotech Inventions.

6. Attempt any *two* of the following : 2×7.5=15

(a) What are the rights associated with registration of trademarks ? Discuss the grounds of refusal of registration of trademarks.

(b) Industrial design is protected by patents, trademarks and copyrights. Explain.

(c) Comment on The Patents Act, 1970 and its Amendments.

[This question paper contains 3 printed pages.]

(13)

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Your Roll No.....

Sr. No. of Question Paper : 6982

Unique Paper Code : 42173922

Name of the Paper : Analytical Clinical Biochemistry

Name of the Course : **B.Sc. (H) Chem./Life Sci./Phys. Sci/  
Ind. Chem. Skill Enhancement  
Course**

Semester : III

Duration : 2 hours

Maximum Marks : 37.5

### Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** question in all.
3. Question No. 1 is compulsory.

1. (a) What are the steps involved in Glucose metabolism?  
Explain Glycolysis in detail.

(b) How is blood stored in blood bank?

(c) What are phospholipids and their importance in biological system? (4.5,3,3)

P.T.O.

2. Point out the three major differences of the following (any three) (3x3)
- (a) Alpha helix and beta pleated sheets
  - (b) Enzymatic reactions and Conventional reactions
  - (c) Steroid hormones and peptide hormones
  - (d) Biological role of DNA and RNA
3. Write short note on any three of the following. (3x3)
- (a) liver cirrhosis
  - (b) Dialysis
  - (c) Thalassemia
  - (d) HbA1c
4. Answer any three. (3x3)
- (a) Role of calcium ions in blood coagulation?
  - (b) Define classification of enzymes.
  - (c) What is the role of cholesterol in the body?
  - (d) Explain Watson - Crick Model of DNA.

5. (a) Highlight the composition of urine sample. (3x3)
- (b) Explain oral glucose tolerance test.
- (c) How would you plan for the disposal of bio-waste?

**OR**

What is the necessary condition to set up a basic pathology lab?

This question paper contains 3 printed pages]

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S. No. of Question Paper : 6985

Unique Paper Code : 32173910

Name of the Paper : Chemistry of Cosmetics and Perfumes

Name of the Course : B.Sc. (H) Chemistry/B.Sc. (Prog.) : SEC

Semester : III

Duration : 2 Hours

Maximum Marks : 37.5

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any four questions.

Question No. 1 is compulsory.

1. Attempt the following :

5×3

- Define cosmetics. How are they classified based on their physical forms ?
- How sunscreens are effective in providing barrier to harmful UV lights ?
- What is the general composition of a shampoo ? Name any two famous brands of shampoo available in market.

P.T.O.

- (d) What is the difference between a sunblock and a sunscreen ?
- (e) Give the steps involved in the preparation of lipsticks.
2. (a) Write the general procedure for the manufacturing process of a face cream.
- (b) Why ammonia and hydrogen peroxide are generally used as a primary component of a permanent hair color ?
- (c) What are the different methods for the removal of unwanted hair from the body ? 3×2.5
3. (a) What are antiperspirants ? Explain giving *two* examples.
- (b) Explain briefly what is meant by SPF ? How sunscreen having SPF-15 different from sunscreen having SPF-30 ?
- (c) What are different raw materials used for the preparation of talcum powder ? 3×2.5
4. (a) Briefly discuss different types of face powder depending upon the nature and texture of skin.

- (b) Discuss the importance of Geraniol and Eugenol in cosmetic industries.
- (c) Explain the use of beeswax and borax as basic ingredient in the formulation of cold creams. 3×2.5
5. Write short notes on (any *three*) : 3×2.5
- (a) Artificial flavours
- (b) Nail polish and nail polish remover
- (c) Cleansing action of shaving cream
- (d) Essential oils.



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S. No. of Question Paper : 7006

Unique Paper Code : 32223904

Name of the Paper : Basic Instrumentation Skills

Name of the Course : B.Sc. (Hons.) Physics/B.Sc. (Prog.) :

SEC

Semester : III

Duration : 3 Hours

Maximum Marks : 50

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all.

1. (a) Explain accuracy, precision and sensitivity of an instrument.
- (b) A set of independent voltage measurement taken by five observers was recorded as 1.001 V, 1.002 V, 0.999 V, 0.998 V and 0.997 V. Calculate average voltage and average deviation.

5.5

P.T.O.

2. (a) Explain with the help of a graph, the limitations of a multimeter while measuring high frequency current and voltage.
- (b) Explain the advantages of an electronic voltmeter over a conventional multimeter for the voltage measurement with respect to input impedance and sensitivity.
- (c) Calculate the value of multiple resistance on the 50 V range of a dc voltmeter that uses a 550  $\mu$ A meter movement with an internal resistance of 2 k $\Omega$ . 4,42
3. (a) What is a CRO ? Explain it with the help of a block diagram.
- (b) What is the sweep generator circuit in CRO ? Why is it used ? 6,4
4. (a) Explain the working of a low frequency signal generator with the help of a block diagram.
- (b) Explain how the harmonic distortion is measured by using a distortion meter ? 5,5

5. (a) How is the digital voltmeter different from analog voltmeter ?
- (b) Explain the operation of a Q-meter with the help of a diagram. 3,7
6. (a) Explain any LCR bridge in detail and obtain its balance condition.
- (b) A Maxwell inductance bridge uses a capacitor of  $C_3 = 0.1 \mu\text{F}$  and operates at a supply frequency of 100 Hz. Balance is achieved when  $R_1 = 1.26 \text{ k}\Omega$ ,  $R_3 = 470 \Omega$  and  $R_4 = 500 \Omega$ . Calculate the resistance and inductance of the measured inductor. 6,4
7. (a) How is the universal counter used for the period measurement ?
- (b) What is a multimeter ? How is it used as an ammeter ? 5,5

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S. No. of Question Paper : 7076

Unique Paper Code : 32493902

Name of the Paper : Protein Purification Techniques

Name of the Course : B.Sc. (H) Biochemistry : SEC

Semester : III

Duration : 2 Hours

Maximum Marks : 50

(Write your Roll No. on the top immediately on receipt of this question paper.)

All questions are compulsory.

Subparts of the questions should be attempted together.

Use of Scientific calculator/log tables may be allowed.

I. (A) Explain briefly :

(a) Protein purification should be performed in the cold.

(b) Large sample volume should not be loaded onto

gel filtration chromatography column.

P.T.O.



- (c) SDS-PAGE is used to estimate the molecular weights of proteins subunits.
  - (d) Anion exchanger are not used at low pH.
  - (e) Samples are boiled in the presence of reducing agent before being loaded for SDS-PAGE.
  - (f) Agarose is not used for the separation of proteins.
  - (g) Sephadex G-25 is commonly used for desalting.
- (B) What do you understand by the following terms :
- (a) Gradient elution
  - (b) Exclusion limit
  - (c) Purification fold. 14,6

2. (A) Answer the following in *one* or *two* words :

- (a) A non-denaturing technique to determine the molecular weight of a protein.
- (b) Non-destructive protein estimation method.
- (c) An example of a cation exchanger.

- (d) A technique to separate basic protein from acidic protein.
  - (e) A dye used to track the electrophoresis.
  - (f) A ligand used for glycoproteins.
  - (g) A matrix used for gel filtration chromatography.
  - (h) A technique used to concentrate proteins.
  - (i) A dye used for staining proteins separated by SDS-PAGE.
  - (j) A technique used for desalting.
- (B) Explain the role of the following :
- (a) SDS in SDS-PAGE
  - (b) Bromophenol blue in electrophoresis
  - (c) Resolving gel in electrophoresis
  - (d) Salting out in protein purification
  - (e) Spacer arm in affinity chromatography.



3. (A) If the following four proteins were loaded on a G-200 column, what would be the order of elution ?

Cytochrome c MW : 13,000

Immunoglobulin MW : 145,000

Ribonuclease A MW : 13,700

Serum Albumin MW : 68,500

If the same four proteins were loaded on a G-25 column, what would be the order of elution ? Justify your answer in both cases.

- (B) Define the following :

(a) Ligand

(b) Void volume

(c) Fractionation Range

(d) Sensitivity of an assay

(e) Denaturant.

- (C) Discuss the principle of Affinity chromatography. 5,5,5



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S. No. of Question Paper : 7077

Unique Paper Code : 32493903

Name of the Paper : Clinical Biochemistry

Name of the Course : B.Sc. (Hons.) Biochemistry : SEC

Semester : III

Duration : 2 Hours

Maximum Marks : 50

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt all questions.

1. (A) Explain the following terms :

(a) Serum

(b) Urine dipstick

(c) Fasting glucose

(d) Glucosuria

P.T.O.

- (e) Direct bilirubin
- (f) Non-enzymatic cardiac marker
- (g) Polyuria
- (h) Atherosclerosis
- (i) Hypoglycemia
- (j) Albumin-globulin ratio.

(B) List out *five* guidelines that should be followed while working with blood samples. 1.5×10,5

2. Answer any *three* :

- (A) A patient comes with symptoms of jaundice. Suggest the blood test results that would confirm the case of hepatic jaundice.
- (B) How is glucose tolerance test performed ? What do you understand by "Impaired Glucose Tolerance" ?
- (C) Give an essay to estimate serum triglycerides.

- (D) What is creatinine clearance test ? What is its significance in clinical diagnosis ? 5,5,5

3. Answer any three :

- (A) Show how LDH isoenzyme "switch" coupled with increases Creatine kinase 2 is diagnostic of myocardial infarction.
- (B) Name a method for estimating urea. Give the normal excretion rate of urea, and condition in which its concentration in urine becomes high and low.
- (C) What do you understand by total cholesterol ? What is the normal cholesterol of total cholesterol in adults sample ?
- (D) Give the principle of Glucose oxidase method of blood glucose estimation. 5,5,5

This question paper contains 3 printed pages

18

09/12/17

Roll No.

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S. No. of Question Paper : 7087

Unique Paper Code : 32173907

Name of the Paper : Analytical Clinical Biochemistry

Name of the Course : B.Sc. (H) Chemistry : SEC

Semester : III

Duration : 2 Hours

Maximum Marks : 37.5

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt four questions, and question 1 is compulsory.

The questions should be numbered in accordance  
to the number in questions paper.

1. With the help of neatly labelled diagram explain Kreb's cycle. 10.5
2. Give an account of any three of the following : 3×3
  - (a) Different classes of enzymes
  - (b) Coenzymes and their functions
  - (c) Double helix model of DNA
  - (d) Nucleotide and Nucleoside.

P.T.O.

3. With the help of neatly labelled diagram, give an account of any *three* of the following : 3×3
- (a) Monosaccharides
  - (b) Transcription
  - (c) DNA replication
  - (d) Liposome.
4. Differentiate between any *two* of the following : 4.5×2
- (a) DNA and RNA
  - (b) Simple lipids and Compound lipids
  - (c) Secondary and tertiary structure of proteins.
5. Explain the following : 3×3
- (a) Outline the complete glycolytic pathway. Give enzymes involved in all steps.
  - (b) What are the different models proposed to explain the mechanism of enzyme action ? Explain them and give a comparative account.
  - (c) What are lipoproteins ?



6. Write short notes on any two of the following : 4.5×2

(a) Composition and function of the blood

(b) Biochemistry of peptide hormones

(c) Urine formation and composition.



This question paper contains 6 printed pages

Your Roll No

(22)



S. No. of Paper : 144  
Unique Paper Code : 32353301  
Name of the Paper : Latex and HTML  
Name of the Course : B.Sc. (Math. Sc.) / B.Sc. (Hons.) /  
B.Sc. (Prog.) - II : SEC  
Semester : III  
Duration : 2 hours  
Maximum Marks : 38

(Write your Roll No. on the top immediately  
on receipt of this question paper.)

*All questions are compulsory*

1. Fill in the blanks: 4×1/2=2

- (i) LaTeX was designed by .....
- (ii) ..... environment creates numbered equations in LaTeX.
- (iii) The command ..... is used to emphasize text in LaTeX.
- (iv) Paragraphs are produced with the ..... element in HTML.
- (v) To create a hyperlink in HTML ..... element is used.

2. Answer any *eight* parts from the following : 8×2=16

P. T. O.

(i) Give the command to include the figure, "myfig.jpg" in a LaTeX document.

(ii) Typeset the statement in LaTeX:

The volume of a regular tetrahedron of edge length 1 is  $\frac{\sqrt{2}}{12}$ .

(iii) What is the output of the command:

$$\int_0^{\infty} e^{-t} t^{-1/2} dt = \sqrt{\pi}$$

(iv) Correct the following input:

If  $\theta = \pi$ , then  $\sin \theta = 0$ .

(v) Give the output of the command:

$\text{\psline(1,1)(5,1)(1,4)(1,1)}$ .

(vi) What does  $\langle head \rangle \dots \langle /head \rangle$  section of a webpage contain?

(vii) Write the postfix notation in standard form:

x 1 add 2 exp 1 x sub div.

(viii) Write the output of the command:

$\text{\put(200,35){\circle{40}}}$ .

(ix) Write the HTML for creating a hyperlink? Explain with an example.

(x) What is the significance of the *alt* tag?

3. Answer any *five* questions from the following:  $5 \times 4 = 20$

(i) Draw the picture of a circle with radius  $r$  and a shaded sector.

(ii) Find errors in the following code and write the corrected version and its output:

```

\Documentclass{article}
\title{My Document}
\author{Student}
\date{13-10-2017}
\maketitle
\begin{document}
\begin{enumerate}
\item Suppose that $x = 137$.
\item Let $n=3$. Then $n^2+1=10$.
\end{enumerate}
\end{document}

```

(iii) Write a code in LaTeX for typesetting the following expression:

$$\tan(\alpha + \beta + \gamma) = \frac{\frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta} + \tan \gamma}{1 - \left(\frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}\right) \tan \gamma}$$

(iv) Write a code in LaTeX for typesetting the following:

Define:

$$V_n = \begin{bmatrix} 1 & 1 & 1 & \cdots & 1 \\ x_1 & x_2 & x_3 & \cdots & x_n \\ x_1^2 & x_2^2 & x_3^2 & \cdots & x_n^2 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \cdots & x_n^{n-1} \end{bmatrix}$$

We call  $V_n$  the *Vandermonde matrix* of order  $n$ . Claim:

$$\det V_n = \prod_{1 \leq i < j \leq n} (x_j - x_i).$$

(v) Create the following presentation in LaTeX:

Slide 1

Armstrong Number

Student A

October 13, 2017

## Slide 2

### Definition

Armstrong number is a number that is equal to the sum of cubes of its digit.

## Slide 3

### Example

Armstrong number is a number that is equal to the sum of cubes of its digit.

Example:  $153 = 1^3 + 5^3 + 3^3$

(vi) Put an image of a mathematical object on your webpage and describe the image.



*This question paper contains 2 printed pages.*

Your Roll No. ....

23



*Sl. No. of Ques. Paper: 237*

*Unique Paper Code : 42163302*

*Name of Paper : Biofertilizers*

*Name of Course : B.Sc. (Prog.) Botany : SEC*

*Semester : III*

*Duration : 3 hours*

*Maximum Marks : 38*

*(Write your Roll No. on the top immediately  
on receipt of this question paper.)*

*All questions are compulsory.*

1. (a) Define the following (any five):

1×5=5

- (i) N<sub>2</sub> fixing bacteria
- (ii) Vesicles
- (iii) Inoculum
- (iv) Biocompost
- (v) Augmentation
- (vi) Microcosm.

(b) Expand the following:

1×5=5

- (i) BGA
- (ii) ICAR
- (iii) PGPR
- (iv) VAM
- (v) FYM

P. T. O.

(c) Give one word answers:

1×5=5

- (i) A free living nitrogen fixing bacteria
- (ii) Name one phosphate solubilizing bacteria
- (iii) A burrowing earthworm
- (iv) Name one biofungicide.
- (v) Intracellular fungal hyphae which invaginates the plasmalemma and forms coils in orchidoid mycorrhizae.

2. Write short notes on the following (any *four*):

- (a) *Trichoderma* as a biocontrol agent
- (b) Solid waste management
- (c) Any one type of composting method
- (d) Carrier based inoculants
- (e) Mass multiplication of microbes. 2.5×4=10

3. Differentiate between the following :

- (a) Ectomycorrhiza and Endomycorrhiza
- (b) Conventional farming and Organic farming.

2.5×2=5

4. *Azolla* is known as “green gold mine”. Justify.

8

Or

Discuss the methods of vermicomposting and its field application in organic farming.

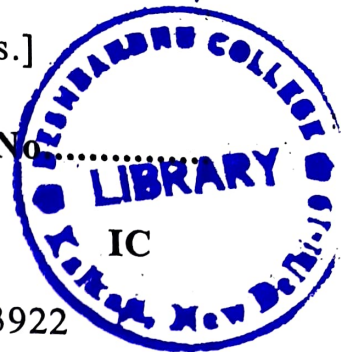
8

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[This question paper contains 2 printed pages.]

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Your Roll No.....



Sr. No. of Question Paper : 244

Unique Paper Code : 32173907/42173922

Name of the Paper : Analytical Clinical Biochemistry

Name of the Course : B.Sc. (Hons.) / B.Sc. (Prog.) – SEC

Semester : III

Duration : 2 Hours

Maximum Marks : 38

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
  2. Attempt **three** questions in all.
  3. Question 1 is compulsory.
- 
1. (a) How will you differentiate between 'holoenzyme' and 'apoenzyme'. (2)
  - (b) Explain "Lock and Key" mechanism of enzyme action. (3)
  - (c) Differentiate between peptide hormone and steroid hormone. (3)
  - (d) Differentiate between 'liposome and lipoproteins. (3)

P.T.O.

- (e) Differentiate between 'nucleoside' and 'nucleotide'.  
(3)
2. (a) What is Enzyme inhibition? Explain allosteric inhibition.
- (b) Describe any two chemical methods to detect the presence of carbohydrate.
- (c) Differentiate between DNA and RNA.
- (d) What are phosphoglycerides? Give their structure and biological significance. (4×3=12)
3. Answer any **three** of the following :
- (a) Composition and function of the blood.
- (b) Isolation and characterization of proteins.
- (c) Urine composition and analysis.
- (d) Give an account for the secondary structure of proteins. (3×4=12)
4. Write the short note on the following : (**any three**)
- (a) TCA cycle
- (b) DNA Transcription
- (c) Chargaff's rule
- (d) Factors affecting enzyme action (3×4=12)





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[This question paper contains 4 printed pages]

**Your Roll No.**

: .....

**Sl. No. of Q. Paper**

: **247**                      **I**

**Unique Paper Code**

: 32173910

**Name of the Course**

: **B.Sc.(Hons.)/B.Sc. (Prog.) :**  
**Chemistry-SEC**

**Name of the Paper**

: Chemistry of cosmetics  
and perfumes

**Semester**

: III

**Time : 2Hours**

**Maximum Marks : 38**

**Instructions for Candidates :**

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
- (b) Attempt **three** questions in all.
- (c) Question NO.1 is compulsory. Attempt any two other questions.

1. (a) Given below is the formulation of a cosmetic product. Recognize it and also write the important uses of the ingredients of this product.

4

Beeswax, Mineral Oil, Borax, Distilled water  
and Perfume

P.T.O.

(b) (i) Write the structure and uses of muscone. 2

(ii) Why is hydrogen peroxide not required for the application of temporary hair dye ? 2

(iii) What are the main differences between cold cream and vanishing cream ? 2

(iv) What are the ideal properties of good nail enamel ? 2

(v) How does SPF value describe the effectiveness of a sun screen cream ? 2

2. (a) Write the essential requirements of compact face powder. How are they different from cream powders (Foundation creams) ? 4

(b) Describe the important uses of various ingredients of vanishing cream. 4



- (c) Name the various methods for extraction of essential oils from plant materials. Describe any **one** method in detail excluding expression method. 4
3. (a) What are the main ingredients of shampoo? Discuss the role of surfactants in them. 4
- (b) Mention the constituents of talcum powder with their importance. 4
- (c) How are hair dyes classified? Discuss permanent hair dyes in detail. 4
4. Write short note on any **three** of the following : 4+4+4
- (i) Deodorants and antiperspirants.
- (ii) Sun screen creams (or lotions)

(iii) Lipsticks

(iv) Hair sprays



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[This question paper contains 4 printed pages]

**Your Roll No.** : .....

**Sl. No. of Q. Paper** : 470 I

Unique Paper Code : 32493901

Name of the Course : **B.Sc.(Hons.)  
Biochemistry : SEC**

Name of the Paper : Tools and Techniques in  
Biochemistry

Semester : III

**Time : 2 Hours**

**Maximum Marks : 50**

**Instructions for Candidates :**

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt **all** questions.

1. (a) Explain the following statements briefly :

2×5=10

(i) Glass cuvettes cannot be used for absorbance measurements in the UV spectral range.

P.T.O.

- (ii) When selecting a buffer for any experiment it is important to know its pKa value.
- (iii) Cuvettes used in fluorimetry are transparent on all sides
- (iv) All fluorescence compounds have cyclic structures.
- (v) In a spectrophotometer, turbid samples can lead to great errors in absorbance measurements.

(b) Write the full forms of the following :

1×4=4

- (i) PPM
- (ii) PMT
- (iii) HEPES
- (iv) ANS

(c) Differentiate between the following :

2×3=6

- (i) Extrinsic and intrinsic fluors
- (ii) Molar and Molal solution
- (iii) Fluorescence and absorption

2. (a) Define the following :

1×6=6

(i) Specific extinction coefficient

(ii) pH

(iii) Normality

(iv) Quenching

(v) Transmittance

(vi) Monochromator

(b) The absorbance  $A$ , of a  $5 \times 10^{-4}$  M solution of the amino acid tyrosine, at a wavelength of 280 nm is 0.75. The path length of the cuvette is 1 cm. Calculate the molar absorption coefficient. 3

(c) Describe the principle of a spectrofluorimeter and write two applications of the technique. 6

3. (a) A solution of purified DNA gave an  $A_{260}$  of 0.35 when measured in a 1cm quartz cuvette in a spectrophotometer. What is the concentration of the DNA in  $\mu\text{g/ml}$  ? 3

- (b) Describe how you would prepare a 0.2M Tris HCl (MW of Tris : 121) buffer of pH 8.0 ? 3
- (c) Draw a schematic diagram of a double beam spectrophotometer. Why is a double beam spectrophotometer better than a single beam one ? 5
- (d) Comment on the use of virtual laboratory tools as a replacement for traditional laboratory sessions. 4



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[This question paper contains 4 printed pages]

**Your Roll No.**

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**Sl. No. of Q. Paper**

: 471

I

Unique Paper Code

: 32493902

Name of the Course

: **B.Sc.(Hons.)**

**Biochemistry : Skill**

**Enhancement Course**

Name of the Paper

: Protein Purification  
Techniques

Semester

: III

**Time : 2 Hours**

**Maximum Marks : 50**

**Instructions for Candidates :**

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) **All** questions are compulsory.

1. (A) State whether the following statements are **true** or **false**. Justify your statement in both the cases :

2×8=16

(i) DNA can be visualized on the agarose gel using acridine orange staining.

P.T.O.



- (ii) For elution of proteins, the pH gradient should increase from a low pH value if anion exchanger is used.
- (iii) Ammonium sulphate is commonly used for salting out of proteins.
- (iv) A spacer arm is interposed between the ligand and the matrix in affinity chromatography.
- (v) Electrophoresis is done with buffers of high molarity.
- (vi) Isoelectric pH of a protein is not an important criteria in SDS-PAGE.
- (vii) Two molecules having the same molecular weight and charge will have the same mobility in electrophoresis.
- (viii) Protein A agarose is used as a ligand to purify avidin.

(B) Give role of the following : 1×4=4

- (i) Sucrose in sample buffer
- (ii) Guard Columns in HPLC
- (iii) Ammonium per sulphate (APS) in PAGE
- (iv) Glycine in running buffer in SDS-PAGE

2. Answer the following :

(i) What are the criteria of selection of a suitable buffer in ion exchange chromatography ? 3

(ii) What are the **two** methods of polymerization of acrylamide monomers in PAGE ? Explain. 3

(iii) Give an example of affinity chromatography which involves the use of metal ions ? Discuss its applications. 4

(iv) Discuss the principle of SDS-PAGE. How the stacking and separating gel differ in terms of composition and function ? 5

3. (a) Differentiate between the following :

3×3=9

(i) Commassie blue staining and ethidium bromide staining

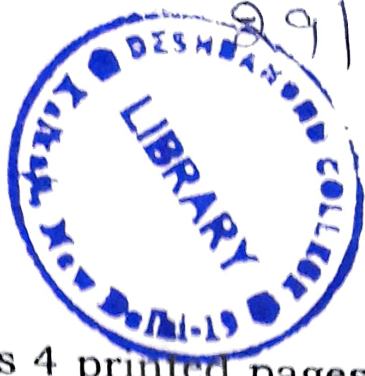
(ii) Dialysis and Reverse Dialysis

(iii) Group specific and substrate specific ligand

(b) Explain the following terms :  $2 \times 3 = 6$   $2 \times 3 =$

- (i) Void volume
- (ii) Binding capacity of an ion exchanger
- (iii) Exclusion limit of gel beads

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[This question paper contains 4 printed pages]

**Your Roll No.**

: .....

**Sl. No. of Q. Paper**

: **472**                      **I**

Unique Paper Code

: 32493903

Name of the Course

: **B.Sc.(Hons.)**  
**Biochemistry : SEC**

Name of the Paper

: Clinical Biochemistry

Semester

: III

**Time : 2 Hours**

**Maximum Marks : 50**

**Instructions for Candidates :**

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
- (b) Attempt **all** questions.

1. (A) Explain the following terms :

15

- (a) Serum
- (b) Urine dipstick
- (c) Fasting glucose
- (d) Glucosuria

P.T.O.



- (e) Direct bilirubin
- (f) Non- enzymatic cardiac marker
- (g) Polyuria
- (h) Atherosclerosis
- (i) Hypoglycemia
- (j) Albumin – globulin ratio

(B) What is the significance of adding the following reagents during blood collection ?

5

- (a) Potassium EDTA
- (b) Sodium fluoride
- (c) Heparin
- (d) Sodium citrate
- (e) Potassium oxalate

2. (A) Explain the biochemical reason for the following conditions. 6

- (a) A positive test for protein in urine.



- (b) Bilirubin level in blood is increased.
- (c) Increased level of triglycerides in serum.

(B) Write note on how isomers of lactate dehydrogenases can be used to assess the health of an individual. 6

(C) What do you understand by KFT ? 3

3. (A) Why do you require to collect a clinical specimen ? Write in details about the collection of three types of specimen and how they can be used in diagnostics. 7

(B) What do you understand by quality control ? What is the difference between precision and accuracy ? 5

(C) Write short note on first aid kit. 3

**OR**

Explain the principle of blood glucose estimation using glucose oxidase method.

15



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[This question paper contains 4 printed pages]

**Your Roll No.** : .....

**Sl. No. of Q. Paper** : **480**      **I**

Unique Paper Code : 32163302

Name of the Course : **B.Sc.(Hons.) Botany  
Skill Enhancement  
Course**

Name of the Paper : Intellectual Property  
Rights

Semester : III

**Time : 3 Hours**      **Maximum Marks : 38**

**Instructions for Candidates :**

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt any **five** questions in all. Question **NO.1** is compulsory.

(c) **All** questions carry equal marks.

1. (a) Expand the following abbreviations (any **five**):

1×5=5

(i) TRIPS

P.T.O.

- (ii) USPTO
- (iii) CRRI
- (iv) EPO
- (v) WIPO
- (vi) WTO

(b) State **True or False** : 0.5×6=3

- (i) Dramatics does not come under copyright.
- (ii) Slogan is a trademark.
- (iii) Traditional Knowledge can be patented.
- (iv) Jewellery design comes under IPR.
- (v) Patents are territorial rights.
- (vi) Mysore Agarbaatti is a GI.

**2. Write short notes on any three :**

3×5=15

- (i) TKDL

(ii) Patent filing Procedure.

(iii) Types of Trademark.

(iv) Works protected under copyright.

(v) Domain name protection.

3. Attempt any **three** :

3×5=15

(a) Name one agricultural, handicraft and industrial product which are under GI and briefly explain about them.

(b) Discuss briefly about Protection of Plant Varieties and Farmers' Rights Act, 2001.

(c) Differentiate between Bio-piracy and Bio-prospecting with **one** example of each.

- (d) Industrial design is protected by patents, trademarks and copyrights. Explain.
- (e) How can software be protected using IPR?



[This question paper contains 4 printed pages.]

11

Your Roll No. 2022.....

Sr. No. of Question Paper : 1284

C

Unique Paper Code : 32173902/42173923

Name of the Paper : SEC- Basic Analytical  
Chemistry

Name of the Course : B.Sc. (Hons.) / B. Sc. (Prog)

Semester : III/V

Duration : 2 Hours

Maximum Marks : 38

Deshbandhu College Library  
Kalkaji, New Delhi-19

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions in all.
3. Question 1 is compulsory.

1. Attempt **any four** :

(a) Does precision always ensure accuracy? Explain.

(b) What are the primary and secondary nutrients present in soil?

P.T.O.

- (c) Differentiate between adsorption and partition chromatography.
- (d) What do you mean by hardness of water? How is it expressed?
- (e) Enlist different reasons for pollution of water bodies. (2×4)
2. (a) What are complexometric titrations? Discuss different types of EDTA titrations with suitable examples.
- (b) Explain the principle and procedure involved in ascending paper chromatography.
- (c) Do as directed :
- (i) Express in scientific notation: 555700
  - (ii) Give the correct number of significant figures: 0.0050830
  - (iii) Round off to three significant figures: 75.8437
  - (iv) Express the result in correct number of significant figures:  $344.88 \times 42.62 / 1110.524$ . (3,3,4)

3. (a) What do you understand by the pH of soil? Explain how it is measured?
- (b) Why water is first passed through cation-exchanger and then through anion-exchanger in the deionisation process.
- (c) In two separate determinations, the concentration of iron in a given sample was found to be (a) 20.19 ppm and (b) 19.20 ppm. Taking the accepted value as 20.00 ppm, calculate the absolute error and relative error as per cent and as parts per thousand in the two determinations. (3,3,4)
4. (a) Define  $R_f$  value. In a paper chromatographic separation, one of the amino acid components travelled a distance of 1.9 cm while the solvent travelled a distance of 5.1 cm. Calculate the  $R_f$  value. Give its units.
- (b) Give the full form of the following (**Any Three**) :
- (i) EBT (ii) TLC (iii) SHE (iv) BOD
- (c) What do you understand by the term 'dissolved oxygen (DO)'? Describe a method to determine DO in a water sample. (3,3,4)

5. (a) What is precision? How is it expressed?
- (b) What is pure water? Discuss the various purification techniques?
- (c) Draw the layer structure of soil and discuss its various layers. (3,3,4)

[This question paper contains 2 printed pages.]

(12)

Your Roll No. 2022.....

Sr. No. of Question Paper : 1289 C

Unique Paper Code : 32173907/42173922

Name of the Paper : SEC: Analytical Clinical Biochemistry

Name of the Course : B.Sc (H)/ B.Sc (Prog)

Semester : III/V

Duration : 2 Hours

Maximum Marks 38

**Instructions for Candidates**



1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **Four** questions from the five questions.
  1. (a) Discuss the biological importance of Proteins.  
(b) What are lipoproteins? Discuss their types and functions.  
(c) Discuss in detail the factors affecting the enzyme activity. (3,3,3.5)
  2. (a) Outline the pathway involved in alcoholic fermentation.  
(b) Explain replication of DNA.

(c) Discuss the biological importance of cholesterol. (3,3,3.5)

3. (a) What are omega-3 and omega-6 fatty acids?

(b) Explain the difference between transcription and translation.

(c) Explain the difference between the lock and key model and Induced fit model in detail. (3,3,3.5)

4. (a) Discuss the composition and constituents of normal and pathological urine.

(b) Write the structures nitrogenous bases present in DNA.

(c) Explain the biochemical function of steroid hormones. (3,3,3.5)

5. (a) What is blood coagulation? Write the symptoms of anaemia.

(b) What are phosphoglycerides? Write its biological importance.

(c) What are three different kinds of RNA and their structures. (3,3,3.5)



[This question paper contains 4 printed pages.]

(13)

Your Roll No. 2022.....

Sr. No. of Question Paper : 1353

C

Unique Paper Code : 32223904

Name of the Paper : Basic Instrumentation Skills

Name of the Course : B.Sc Prog CBCS\_SEC  
(Prog / Hons)

Semester : V/III

Duration : 3 Hours

Maximum Marks 70



### Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **five** questions in all. **All** questions carry equal marks.
3. Use of non-programmable scientific calculator is permitted.

1. (a) Describe the static characteristics of an instrument. Explain the difference between accuracy and precision of a measurement with an example.

P.T.O.

- (b) What is limiting error? A voltmeter reads 70 V on its 100 V range and an ammeter reads 80 mA on its 150 mA range are used to determine the power dissipated in a resistor. Both these instruments are guaranteed to be accurate within  $\pm 1.5\%$  at full scale deflection. Determine the limiting error of the power. (5,5)
2. (a) Explain the principle of voltage measurement of an ac millivoltmeter with block diagram. A basic D'Arsonval movement with a full-scale deflection of  $200 \mu\text{A}$  and internal resistance of  $100 \Omega$  is used as a voltmeter. Determine the value of the multiplier resistance needed to measure a voltage of range 0-50 V.
- (b) Explain the operation of full wave rectifier type AC voltmeter with a suitable diagram. (5,5)
3. (a) Draw the block diagram of a Cathode Ray Oscilloscope (CRO) and explain the functions of each block.

- (b) Distinguish between dual beam and dual trace CRO. (5,5)
4. (a) Explain the operation of Schering bridge to determine the unknown Capacitance and also derive the relevant balancing equations.
- (b) A Wein bridge at balance has the following components given as:  $R_1 = R_2 = 820 \Omega$ ,  $C_1 = 0.2 \mu\text{F}$ ,  $C_2 = 0.4 \mu\text{F}$ , and  $R_3 = 1.5 \text{ k} \Omega$ . Determine the frequency of the bridge. (5,5)
5. (a) Describe the working of a Q-meter for measurement of high impedance value.
- (b) What is distortion factor meter. Explain its working. (5,5)
6. (a) Draw the block diagram of a pulse generator and explain its operation.
- (b) What is a universal counter? How can it be used to measure the frequency, time and period. (5,5)

7. Write short notes on the followings : (5,5)

(a) Digital storage Oscilloscope

(b) Digital multimeter

[This question paper contains 2 printed pages.]

(14)

Your Roll No.....2022

Sr. No. of Question Paper : 1458

C

Unique Paper Code : 32173907 / 42173922

Name of the Paper : SEC: Analytical Clinical  
Biochemistry

Name of the Course : B.Sc (H) / B.Sc (Prog)

Semester : III / V

Duration : 2 Hours

Maximum Marks : 38

Instructions for Candidates

Deshbandhu College Lib  
Kalkaji, New Delhi

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions from the **five** Questions.
  1. (a) Discuss the biological importance of carbohydrates.  
(b) Write the structures of sugar present in DNA and RNA  
(c) What are cofactors and coenzymes? (3,3,3.5)
  2. (a) Discuss the mechanism of enzyme action and the factors which affect the enzyme activity.  
(b) Explain the Krebs cycle briefly.

(c) Write the composition and functions of blood.  
(3,3,3.5)

3. (a) Describe the binding role of  $-OH$  and  $-NH_2$  groups in structure activity relationship.

(b) Explain the Watson Crick model of DNA in detail.

(c) What are the triglycerides? Discuss the biological importance of triglycerides.  
(3,3,3.5)

4. (a) Write the structure of ATP. Why ATP is called universal currency of cellular energy?

(b) Write the structures nitrogenous bases present in RNA.

(c) Explain the biochemical function of peptides hormones.  
(3,3,3.5)

5. (a) Discuss the importance of biocatalysis in green chemistry.

(b) Define transcription and translation.

(c) What are Liposomes? Discuss its biological Importance.  
(3,3,3.5)



[This question paper contains 4 printed pages.]

(15) Your Roll No. 2022

Sr. No. of Question Paper : 1459

Unique Paper Code : 32173902 /42173923

Name of the Paper : SEC : Basic Analytical  
Chemistry

Name of the Course : B.Sc.(Hons.)/B.Sc. (Prog.)

Semester : III/V

Duration : 2 Hours Maximum Marks : 38

Instructions for Candidates **Deshbandhu College Library**  
**Kalkaji, New Delhi**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all.
3. Question no. 1 is compulsory.
4. The questions should be numbered in accordance to the number in the question paper.
5. Use of non - programmable scientific calculators and log tables are allowed.

P.T.O.

1. Attempt any **four** :

(a) A sodium phosphate solution is passed through a column of an anion exchanger in the chloride form. The  $\text{PO}_4^{3-}$  ions are taken up by the ion exchanger. Write down the ion exchange equilibria.

(b) Give the name and structure of the indicator employed in the  $\text{Mg}^{2+}$  - EDTA titration.

(c) Express the result of the following calculation to the correct number of significant figures:  $26.234 + 143.4$ .

(d) Quote two examples on the interdisciplinary nature of analytical chemistry.

(e) What does a high and a low value of dissolved oxygen signify? (2×4)

2. (a) Outline the steps commonly employed in an analytical procedure. Briefly describe each step.

(b) Explain chelate effect.

(c) Give the answer of the following operation to the correct number of significant figures and indicate the key number :

$$\frac{42.68 \times 891}{132.6 \times 0.5247} = \quad (3,3,4)$$

3. (a) Discuss any three methods to minimize systematic errors.
- (b) Differentiate between :
- (i) Mean and Median
  - (ii) Absolute error and Relative error
- (c) Give the principle behind thin layer chromatography. Explain briefly how a TLC plate is developed, run and the various components detected. (3,3,4)
4. (a) How will you control the pH of an acidic and a basic soil?
- (b) Classify the following as additive / proportional error :
- (i) Loss in weight of a crucible, in which the precipitate is ignited.
  - (ii) An impurity in standard solution.
  - (iii) Errors in weights.

(c) List the various sources responsible for water contamination. Discuss briefly. (3,3,4)

5. (a) Give one word :

(i) Errors which cannot be corrected.

(ii) Square of standard deviation.

(iii) A determination that is carried out with the sample being omitted, under exactly the same experimental conditions.

(b) Explain the term sampling. Give its importance in chemical analysis.

(c) The titre volumes of a particular titration carried out by three students A, B, and C are given below. Compare the accuracy and precision of the three students, if the true titre volume is 22.22 mL.

Titre volumes by Student A (in mL): 22.22, 22.24, 22.23, 22.21, 22.20

Titre volumes by Student B (in mL): 22.28, 22.27, 22.29, 22.28, 22.28

Titre volumes by Student C (in mL): 22.38, 22.12, 22.32, 22.30, 22.18. (3,3,4)

[This question paper contains 4 printed pages.]

(16) Your Roll No. 2022.....

Sr. No. of Question Paper : 1678 C

Unique Paper Code : 32163302

Name of the Paper : Intellectual Property Rights

Name of the Course : BSc. (H) Botany: Skill Enhancement Course

Semester : III

Duration : 2 Hours

Maximum Marks : 38

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.

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Kalkaji, New Delhi-110

2. Attempt any 5 questions in all.

3. Question 1 is compulsory

4. Attempt all parts of a question together.

1. (a) Expand the following (**any five**): (1×5=5)

(i) WTO

(ii) TRIPS

(iii) TKDL

(iv) WIPO

(v) NGB

(vi) GATT

(b) State whether the following statements are True or False (any five) (1×5=5)

(i) A Patent application can be updated after it has been filed to incorporate new features.

(ii) Customs authorities have no role in enforcement of Intellectual Property Rights.

(iii) BMW is an example of brand Trademark.

(iv) Coorg orange is an example of GI.

(v) The Industrial Design Headquarter patent office is at Kolkata.



(vi) The use of bio resources by the, Multinational companies and other organizations without any systematic approval from a nation or its related people is known as Bioprospecting.

2. Explain how patents can be registered in India with the help of suitable flowchart. What are the basic criteria of Patenting? (7)
3. Differentiate between (any Two): (2×3.5=7)
- (a) Infringement of Trademarks and Passing-off
  - (b) Bio-prospecting and Bio-piracy
  - (c) Process and Product patent
4. (a) What has led to the establishment of TKDL by the Government of India? Discuss the setup of TKDL. (5)
- (b) What is a domain name? What are the safeguards provided to protect domain names under IPRs. (2)
5. What is a Database? List various Biological Databases. Discuss the objectives and provisions of Database protection under IPR laws. (7)

6. List the classes of work for which Copyright protection is available in India. What amounts to Copyright infringement? Discuss the protective measures provided against copyright infringements under copyright laws. (7)

[This question paper contains 4 printed pages.]

(17)

Your Roll No. 2022.....

Sr. No. of Question Paper : 1682 C

Unique Paper Code : 32173910

Name of the Paper : SEC: Chemistry of Cosmetics  
& Perfumes

Name of the Course : B.Sc. (Hons)/ B.Sc. (Prog)

Semester : III/V

Duration : 2 Hours

Maximum Marks : 38

### Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

2. Attempt **two** questions in all. **Deshbandhu College**  
**Kalkaji, New Delhi-19**

3. All questions carry equal marks.

1. (a) Define cosmetics. How do you classify cosmetics on the basis of physical form.

(b) Distinguish between Cold cream and Vanishing cream. List the ingredients used in their formulation.

(c) Write short note on :

(i) shampoo and conditioner

(ii) deodorants and antiperspirant

(d) What are the ideal characteristics of Nail polish?  
Name the ingredients used in its remover.

(4,5,5,5)

2. (a) What are emollients? What is their function in various skin products?

(b) How do you classify hair dyes? Write the merits and demerits of use of dyes.

(c) Discuss the cosmetic properties and uses of Eucalyptus oil and Sandalwood oil.

(d) What are the essential characteristics of face powder? What is role of talc in talcum powder?

(4,5,5,5)

3. (a) Define SPF? What does SPF 30 signify? How sunscreens are effective in protection from harmful UV radiations?

- (b) What are hair sprays? List the parameters considered for the designing of hair spray.
- (c) What are oral hygiene products? Give the composition of a mouth wash.
- (d) Discuss the role of preservatives in various cosmetics. (4,5,5,5)
4. (a) Discuss the structure of skin. Briefly describe the essential requirements for a skin care cosmetic product.
- (b) Give a brief outline of method of preparation of lipstick.

Fill up the blanks with reference to lipsticks;

- (i) Vegetable oil most commonly used  
\_\_\_\_\_
- (ii) The shelf life of lipstick could be upto  
\_\_\_\_\_
- (iii) Any one preservative used in lipstick  
\_\_\_\_\_

(c) How are shaving creams prepared? Mention the ingredients of a shaving cream.

(d) Give examples of cosmetics in the following categories;

(i) Curative

(ii) Protective

(iii) Decorative

(4,5,5,5)



[This question paper contains 4 printed pages.]

(18)

Your Roll No..... 2022

Sr. No. of Question Paper : 1688

C

Unique Paper Code : 42353328

Name of the Paper : SEC-1 Computer Algebra System

Name of the Course : **B.Sc. (Math Sci) – II**  
**B.Sc. (Phy Sci) – II**  
**B.Sc. (Life Sci) – II**  
**B.Sc. (Industrial Chemistry)– II**  
**Analytical Chemistry – II**

Semester : III

Duration : 2 Hours

Maximum Marks : 38

Instructions for Candidates **Deshbandhu College Libr**  
**Kalkaji, New Delhi-19**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. All questions are compulsory.
3. This question paper has **four** questions.

1. State whether the following statements are true or false. Justify your claim : (1×10=10)

P.T.O.

- (i) Output of the syntax **Sin[x] \. x → 0** is **0**.
- (ii) In Mathematica, **A \* B** gives the usual matrix multiplication of matrices A and B.
- (iii) Output of the syntax **Reduce[x<sup>2</sup> == 25]** is **x == 5 || x == -5**.
- (iv) Output of the command  $\frac{31}{2}$  in Mathematica is **15.5**.
- (v) The numerical value of the last output can be obtained by **N[%]**.
- (vi) The command **Simplify** can not be used to simplify the expressions involving trigonometric functions.
- (vii) The syntax **Limit[f[x], x → 0, Direction → 1]** gives limit of the function f(x) from the left direction.
- (viii) Outputs of **Sum[i<sup>2</sup>, {i, 1, 100}]** and  $\sum_{i=1}^{100} i^2$  are the same.
- (ix) The command **Eigensystem** can give the list of all eigenvectors only.
- (x) The output of the syntax **MatrixRank[Array[Max, {3,3}]]** is **3**.

2. Attempt any **four** parts from the following :

(2.5×4=10)

(i) Write the syntaxes to plot the graphs of the following functions :

(a)  $f(x) = e^x + \log x, \quad 1 \leq x \leq 5.$

(b)  $k(x,y) = \sqrt{x} + \sqrt{y}, \quad 0 \leq x \leq 7, \quad 0 \leq y \leq 5.$

(ii) Discuss the use of round, curly and square brackets in Mathematica. Write a single syntax using all of these brackets.

(iii) Explain the significance of the command **FindRoot** in solving general equations.

(iv) Discuss the use of '=', '==', ':=', '?', ';' in Mathematica.

(v) Explain the significance of the command **Apart** when working with the rational functions.

(vi) Write the output of the following commands:

(i) `Solve [ax2 + bx + c == 0, x] // Grid.`

(ii) `Solve [{x - y == 1, x + y == 2}].`

3. Write the output of any **four** parts from the following : (2×4=8)

(i) `Table[0, {3}, {3}] - DiagonalMatrix[{1, 2, 3}] // MatrixForm.`

(ii) **Take[Array[Min, {4,4}], -2]//MatrixForm.**

$$(iii) \text{ mat} = \begin{pmatrix} 1 & 1 & 4 \\ 2 & 1 & 0 \\ -3 & 0 & 1 \end{pmatrix};$$

$$\text{mat}_{[2]} = \text{mat}_{[2]} - 2 \text{mat}_{[2]};$$

**mat//MatrixForm**

(iv) **Assuming [n > 0, Integrate[Abs[x],{x, -n, n}]]].**

(v) **NSolve[D[8.01 + 12x - 6x<sup>2</sup> + x<sup>3</sup>, x] == 0, x].**

$$(vi) \text{ Limit} \left[ \frac{1-x^n}{n}, x \rightarrow 0, \text{ Assumptions} \rightarrow n > 0 \right].$$

4. Write short notes on any **four** parts from the following : (2.5×4=10)

- (i) Manipulation of trigonometric expressions in Mathematica.
- (ii) Investigating functions with the use of the command **Manipulate**.
- (iii) **BasicMathInput** palette in Mathematica.
- (iv) Performing Gaussian Elimination using Mathematica.
- (v) Computing maxima and minima of a function using Mathematica.
- (vi) Computing definite integrals using Mathematica.